

SLAudioNormalizer



Automated Normalization of
Audio Volume of Media Materials (Files)
Before Playback in FDO nAir

*Revision as of:
June 16, 2015*

User's Guide



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Introduction

The SLAudioNormalizer program is designed for organization of automatic normalizing volume level of audio and video clips (WAV, AVI, MPEG, Windows Media, Quick Time, MXF (if the MXFPlayback plugin is present)) played in FDOOnAir.

The program processes files in specified folders. The result is updating or creating SLIni file for each processed audio and video file. Each file includes value of the VolumeDB parameter. The value is selected automatically. The value is used for normalizing sound at clip playback. No change is made with audio and video files.

- Note:**
1. Audio and video files are played in the FDOOnAir program basing on general settings specified in the FDConfiguration and the FDSoundControl (or FDConfig2) programs. To adjust playback parameters of separate files (for example, to increase audio level or image contrast) specific files with settings, i.e. SLIni files are used. For more information see the "FDOOnAir. Additional Sections" guide, the "SLIni Files. Customizing Playback of Audio and Video Files" subsection.
 2. The VolumeDB parameter recorded in the SLIni file is used for automatic adjusting audio volume at playback of corresponding clip. The parameter specifies value (in dB) in which initial audio level is changed. Parameter value is a number with one digit after comma in the range from -96 up to +24 (in software versions earlier than 5.7.0 – integer from the same range).
(In software versions earlier than 5.3.0 the Volume parameter is used in the same purposes. The value is an integer from 0 up to 1000 – percent from initial audio level. Examples of values are: 0 denotes absence of sound; 100 denotes initial audio level; 1000 denotes level increased in 10 times comparing with the initial level).

The SLAudioNormalizer program is included into the ForwardT Software set starting from version 5.2.0.



General Information

1. Purpose and Scope of Application

The SLAudioNormalizer program is an application that allows automating work on normalizing audio level at playback of audio and video files in the FDO nAir program.

The application is used to adjust values of the VolumeDB parameter for clips located in specified folders automatically. The values are necessary at playback of clips in order to adjust sound to desired level.

Usually the application is launched with the FDO nAir program together in some time before start of schedule execution.

Take into account that processing files must be finished before start of their playback in FDO nAir schedule if you deal with SLAudioNormalizer. Analysis of sound and adjusting values for VolumeDB also take some time.

2. Methods of Normalizing

The following methods of normalizing audio level are available in the SLAudioNormalizer program:

- by maximum of amplitude – adjusting maximal amplitude values of audio waveform to specified level (from –96 up to 0 dBFS);
- by meansquare level (RMS) – adjusting meansquare value of sound level in clip to specified level (from –96 up to 0 dBFS);
- ITU-R BS.1770-3/EBU R128-2011 (–23LKFS/LUFS) – adjusting integral loudness of TV program (Program Loudness) to desired value (from –36 up to –6 LUFS). The function is realized according to "Recommendations to normalizing audio signals in TV broadcasting field" (Ministry of Communications order in Russia, 21.05.2015).

3. Adjusted Parameters

User adjusts the following monitoring parameters himself:

- general:
 - list of folders where files should be processed with a purpose of normalizing loudness. There is a possibility of selecting both local and remote (located on network disks) folders;
 - mode of processing: order of files searching, timeout – time needed to observe each file before start normalizing (5 seconds is by default), wait if error files are detected, processing separate WAV files;



- for each folder independently:
 - limit of maximal data rate; it allows avoiding failures when several programs execute some disk operations at the same time: from 100 up to 100000 Kbyte/sec;
 - method of normalization of sound level and needed value;
 - priority of folders processing.

✓ **Important:** Specify values taking into account some working features of normalization method. Note that each method has its own algorithm of normalization. If level values are the same results of work will be various because of different used methods. It is advised to study used method in details if you want to get predictable results.

You may find some recommendations on customizing normalization by RMS in the subsequent "Work Order" section, "2. Normalization by RMS..." item.

4. Modes of Functioning

The program has 2 modes of work:

- Monitoring on – the following functions are executed here:
 - automatic scanning of specified folders and processing files in order to normalize sound level;
 - forced start of normalization of files volume located in specified folder by user;
- Monitoring off – the program scans nothing and no files are processed.

Switching monitoring on/off is implemented by user via the Start/Stop button located in the main program window or commands of context menu in system tray. There is also a possibility to customize switching of monitoring on automatically when the program is launched.

Monitoring parameters can be customized in any mode.

5. Rules of Files Processing

1. Files are processed only when monitoring mode is on. The program always scans specified folders and monitors appearing of audio and video files to be processed in this mode. Files can be placed in folders at any time.

Note: Audio data combined with video is processed in any way without depending on way of storing: in one file with video data or in separate WAV files in the same folder with video data. Independent WAV files (audio clips without video) are processed only if corresponding mode is on.



2. The program starts processing clip automatically in the following cases:
 - if SLIni file for this clip is absent;
 - if there is SLIni file but field with VolumeDB is absent.

✓ **Important:** Clips which SLIni files have already line with the VolumeDB parameter won't be processed automatically.

Clips in folder can be processed manually. In this case all files are processed: recently appeared and processed earlier. Information in VolumeDB lines in corresponding SLIni files is updated.

3. Audio and video files are processed one by one. At automatic scanning order of processing clips from different folders depend on mode of files searching and setting folder priority specified by user.
4. Each clip is processed in 2 steps. First is when file is scanned during some time (user specifies timeout in this case). If file is changed somehow during scanning (for example, it is copied to folder and its size is changed) then the second step is cancelled. If file is not changed then the next step is executed.

The second step is when analysis of sound in file starts and value of the VolumeDB parameter is calculated (method of normalization and needed level are specified by user at customizing). Results are recorded to SLIni file that is located in the same folder with processed file.
5. At customizing user selects one of the following sets of actions if file is not managed to be processed by some reasons (for example, sound in file is absent, format of sound is not supported, file is being copied, etc.):
 - create SLIni file and record the VolumeDB parameter with 0 value;
 - do not create SLIni file. In this case a new attempt to process file is undertaken.
6. Information on results of processing (including errors) is recorded to log.

6. User Interface

There are two modes of user interface:

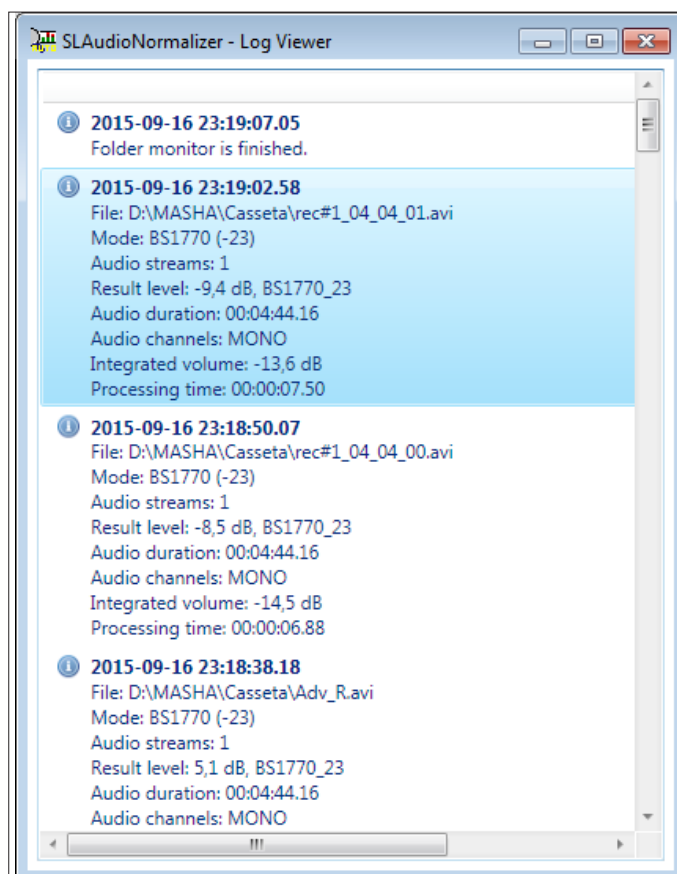
- window – the main window of the program is opened. Customizing and monitoring folders are executed; also information on work is displayed here;

- minimized – program window is minimized to the icon located in system tray. Commands for monitoring control are launched via context menu of the program.

There is a possibility to select mode active at program launch.

7. Log (Work Protocol)

Information on working sessions: start/stop of monitoring, data on processed files (parameters of audio and video data, normalization results, etc.), error messages are automatically logged. Records are arranged according to time.



Log is kept in text file which name has the SLANLog extension. Default file is:

~\SoftLab-NSK\Data\SLAudioNormalizer\SLAudioNormalizer.SLANLog, where ~ is a disk for distributing working folders specified at installation.

You may study log via additionally opened window. Also log can be opened in any text editor, for example, Windows Notepad.

There is a possibility to customize the following parameters of keeping log: location and name of log file, maximal records count, writing extended error information.



Start and Finish of Working With Program

Full path to file of the SLAudioNormalizer program is:

~\SLAudioNormalizer\SLAudioNormalizer.exe

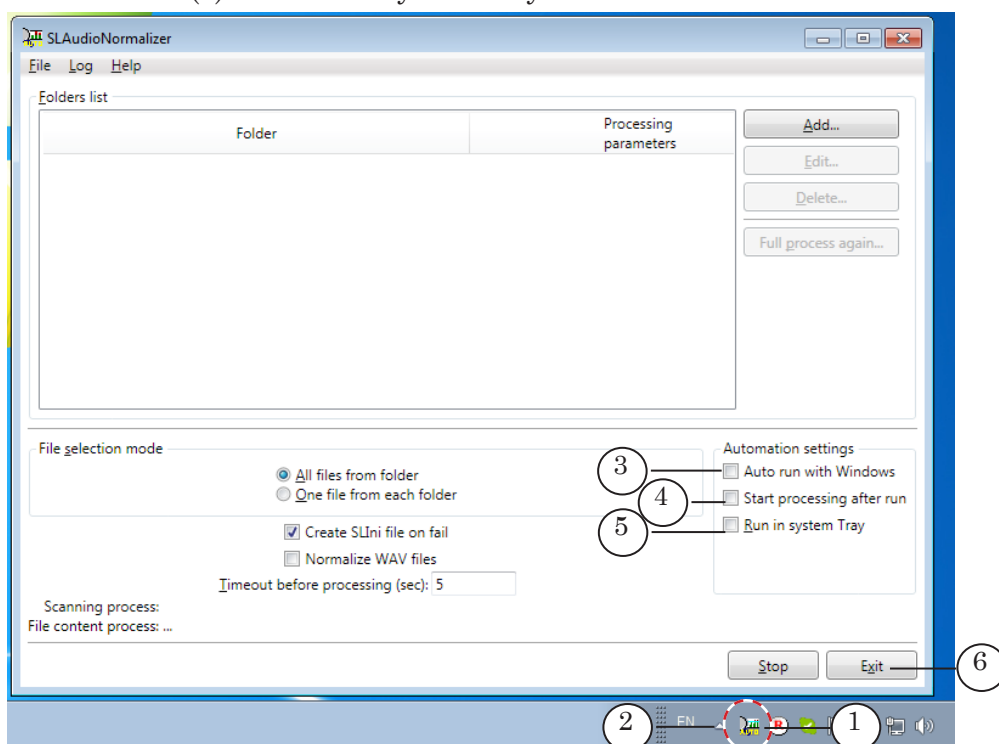
where ~ is a full path to folder where ForwardT Software is installed (the C:\Program Files\ForwardT Software folder is at standard installation).

Also you may use the Start menu command:

All Programs > ForwardT Software > Tools > AudioNormalizer.

At first program launch the main program window with default settings appears. During the next sessions the last configuration is active.

When program is launched its icon is placed to system tray (1) automatically. The icon can be hidden. If you want to see it click the (2) element in system tray.



There is a possibility to customize mode of program launch by enabling/disabling:

- autorun with Windows (3);
- automatic processing after run (4);
- launch of the program in a minimized window mode (located in system tray) (5) .

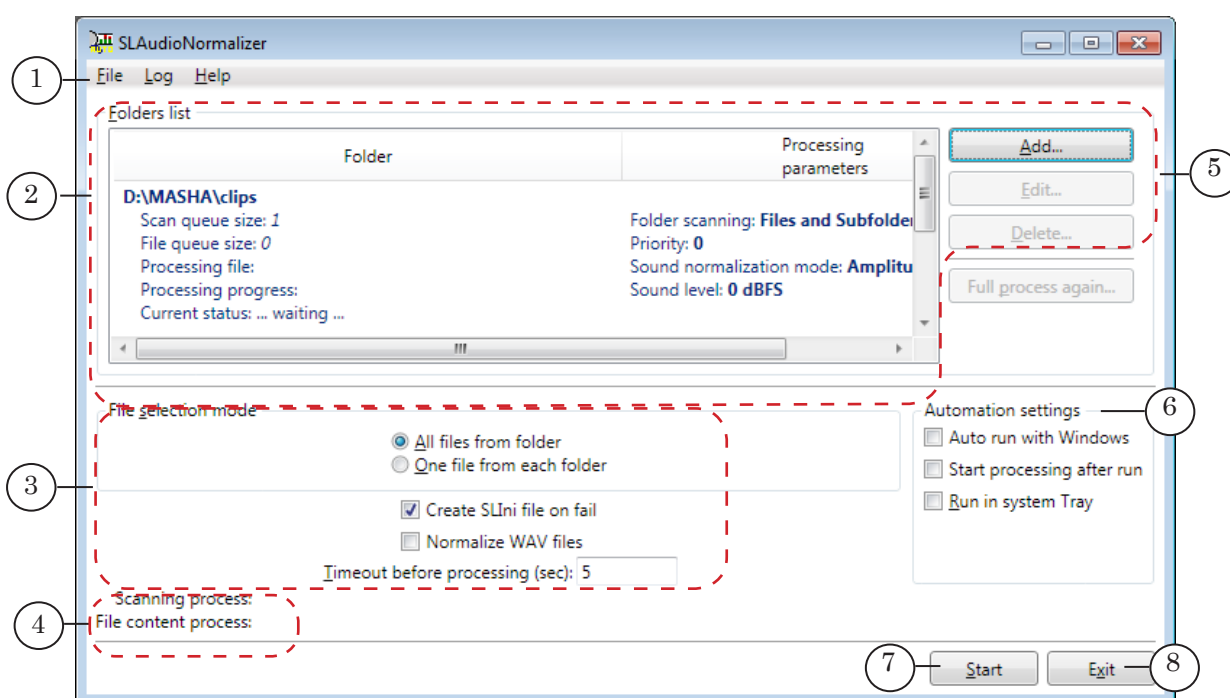
Use the Exit button (6) or the File > Exit menu command to finish working with the program and close the main window.

Interface

1. Main Program Window



The main program window is used to customize and control monitoring folders and processing files.

Note: For detailed information on procedure of working you may open program log in additional window.



Main window. Control elements:

1 – main window; 2 – elements for customizing list of folders and implement control over work; 3 – elements for customizing processing mode; 4 – information on processing procedure; 5 – launch processing files in selected folder in table (available only if **Monitoring** is on); 6 – elements for customizing parameters of program launch; 7 – button used to switch monitoring on/off; 8 – button used to finish working with the program: switch monitoring off and close the program window.

The Minimize () and Close () buttons located in title area of the main program window are used to minimize the window. Program icon in system tray in this case appears.

2. Working With Folders List

2.1. Table With Folders List

The Folders list table in the main window shows a list of folders to be processed, active settings of processing parameters and information on working procedure (see the table below).

Order of folders distribution in table specifies general sequence of files scanning and processing.

Note: Order of selection of file for processing depends on specified priority of folders and active mode of files selection (see the "3. Order of folders and files processing" subsequent section).

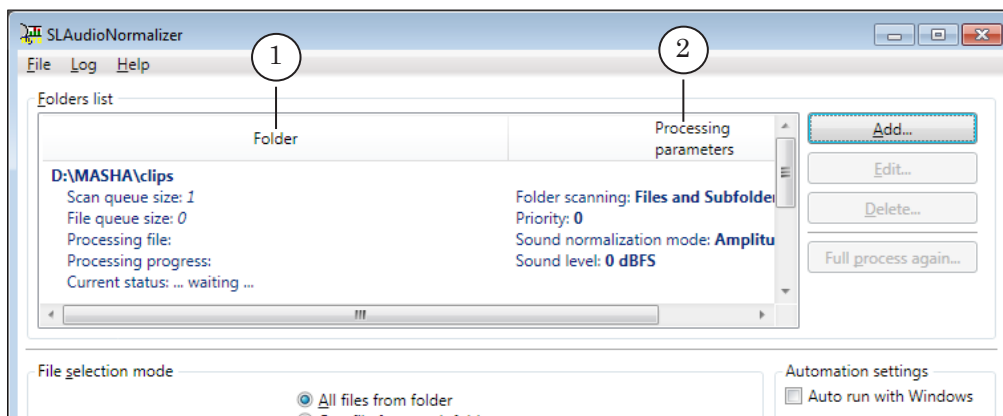
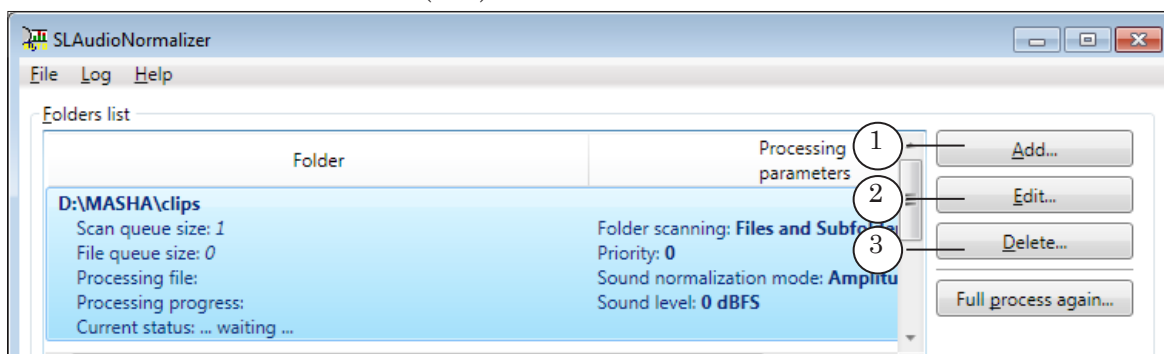


Table 1. Fields of Folders list table

Name	Displayed information
Folder (1) is a full path to folder and information on state of processing at the current moment.	
Scan queue size	Quantity of folders that must be scanned.
File queue size	Quantity of files that must be processed.
Processing file	Name of processed file.
Processing progress (%)	Indicators of file processing progress (analysis and calculation of the VolumeDB parameter): graphical and numerical (in percent).
Current status	State of processing procedure at the current moment. Possible values here are: waiting – file is not scanned/processed; scanning folder; processing folder.
Processing parameters (2) denotes settings active for corresponding folder.	
Folder scanning	Mode of processing subfolders: switch on/off.
Priority	Priority is normalization assigned to maximal possible data stream at reading files from disk (Kbyte/sec).
Sound normalization mode	Selected mode of sound normalization: according to maximal amplitude, RMS, according to ITU–R BS.1770-3/EBU R128 (-23LKFS/LUFS) recommendations.
Sound level	Needed value for selected method.

2.2. Buttons for Editing List

Use the (1–3) buttons to edit list of folders in table.

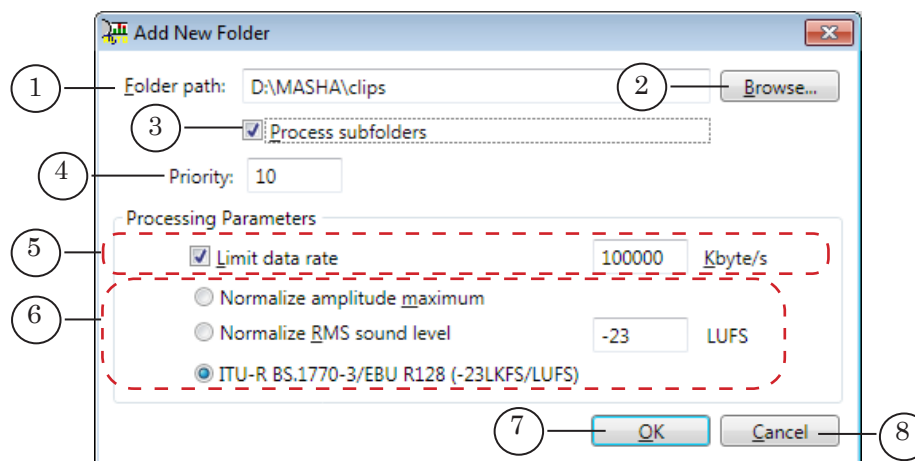


Buttons for editing list:

1 is used to add folders to list and customize processing parameters; 2 is used to change settings of processing parameters of selected folder; 3 is used to delete selected folder from the list.

2.3. Adding Folder to List. Adjusting Settings

Windows with settings opened via the Add... and Edit... buttons are identical concerning set and functional purposes of control elements.



Add New Folder Window. Control Elements:

1 displays a full path to specified folder; 2 is used to open standard dialog for selecting folder; 3 is used to enable/disable processing files from all subfolders of the specified folder; 4 is used to set a folder priority; 5 is used to customize limit of read data rate for specified folder: switch mode on/off and specify maximal available rate; the 6 elements are used to select method of normalization and specify needed level value; 7 is used to close window and add folder to list; 8 is used to close window without applying any changes.

The Priority parameter value (0 is the smallest value; 10 is the largest value) influences order of folders processing: all folders in queue are distributed according to decreasing values of this parameter. For more information see the "3. Order of processing folders and files" subsequent section.

3. Order of Processing Folders and Files

3.1. Rules

Order of processing folders and selection of files depend on the following items:

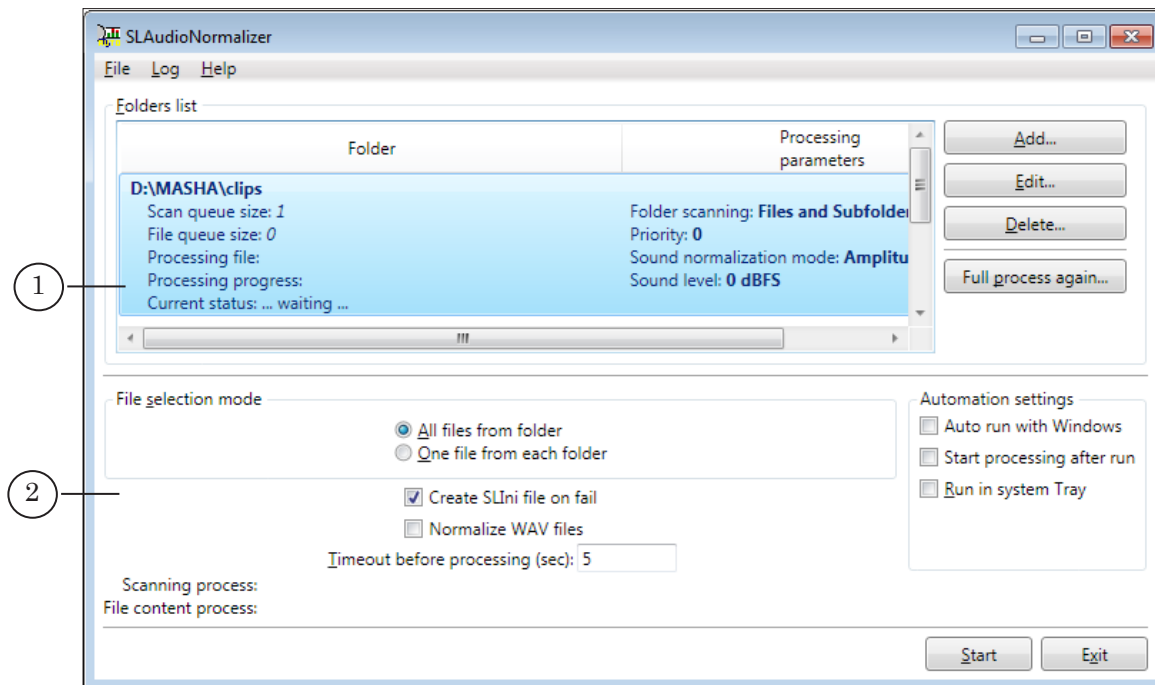
1. Folders priority. Priority is specified for each folder independently in window with configuration of processing folder parameters (see the "2.3. Adding folder to list. Adjusting settings" section above).

Folders are processed in decreasing order of the Priority parameter values. If some folders are of the same priority then they are distributed according to sequencing in list. If all folders in list are of the same priority then they are distributed according to sequencing in list considering specified mode of files selection.

2. Mode of files selection (for more information see the subsequent subsection). It works if all folders in the list are of the same priority, in case of different priorities – it is ignored.

3.2. File Selection Mode

If list in monitoring table (1) has several folders then they are monitored consistently, program starts from the first folder and monitors folders in up-down direction.



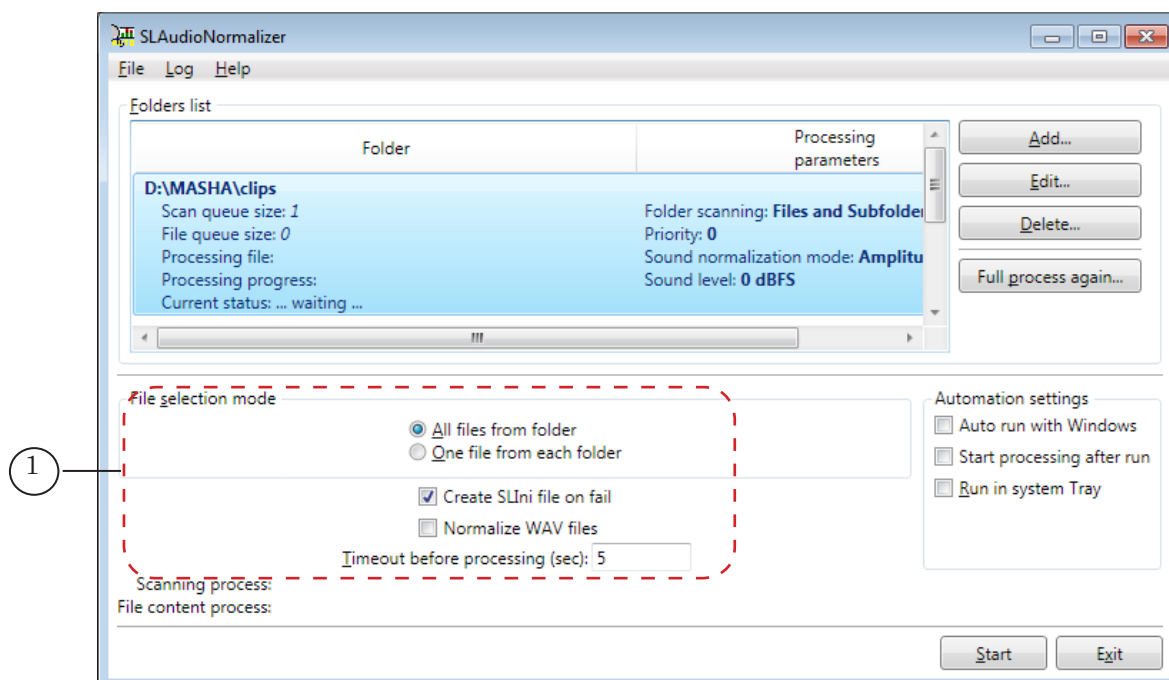
Radio buttons located in the Files selection mode group of elements (2) are used to set order of selecting files at processing (is active only when all folders are of the same priority). Possible variants here are:

- All files from folder – first all files from the first folder in list are processed, then – from the second folder, etc.;
- One file from each folder – first one file from the first folder is processed, then one file from the second folder, etc. When file from the last folder is processed the program returns to the first folder and processes the rest files from each folder consistently till all values of the VolumeDB parameter for all files are calculated.

4. Processing Mode

Parameters of processing are the same for all folders. They are customized via elements located in the main program window (1):

- File selection mode is a sequence of processing files and folders (see the "3. Order of Processing Folders and Files" section above);



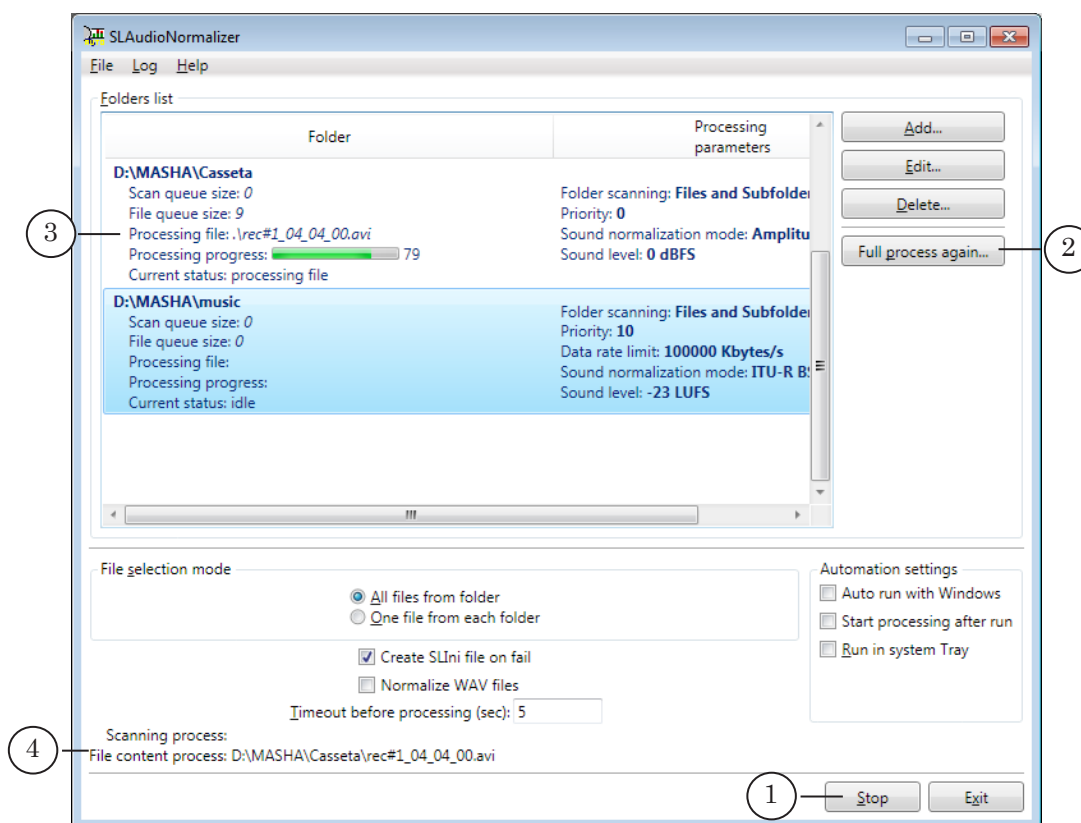
- Create SLIni file on fail is selection of behavior if processing some file is impossible (for example, if there is no sound in file, format of sound is not supported, file is being copied, etc.):
 - if the mark is absent – undertake new attempts to process file;
 - if the mark is put – create SLIni file and record the VolumeDB parameter with the 0 value in it;

Note: Information on results of processing including data on errors is recorded to log (for more information see the "General Information on Program" section, the "7. Log" subsection).

- Normalize WAV files is the mode of audio clips processing (only sound without video):
 - if the mark is absent then only audio data of video clips is processed (without depending on way of storing audio and video: in one or separate files);
 - if the mark is put then audio and video data and independent clips are also processed;
- Timeout before processing is time rest before start of audio clips processing. If during this period of time file is not changed then normalization starts.

5. Control Over Files Processing

Files are processed only when monitoring mode is on. Click Start/Stop (1) to switch the mode on/off.



Processing starts automatically in the Monitoring on mode. It starts in case if file for which the VolumeDB parameter value in SLIni file is not specified and when it appears in folder.



In order to force start processing all files in selected folder click the Full process again button (2). Present values of the VolumeDB parameter are updated in SLIni files in this case.

✓ **Important:** Processing files (both automatic and forced) is implemented only when monitoring is on.

Information on working procedure is displayed in the Folder area (3) and in additional information fields (4):

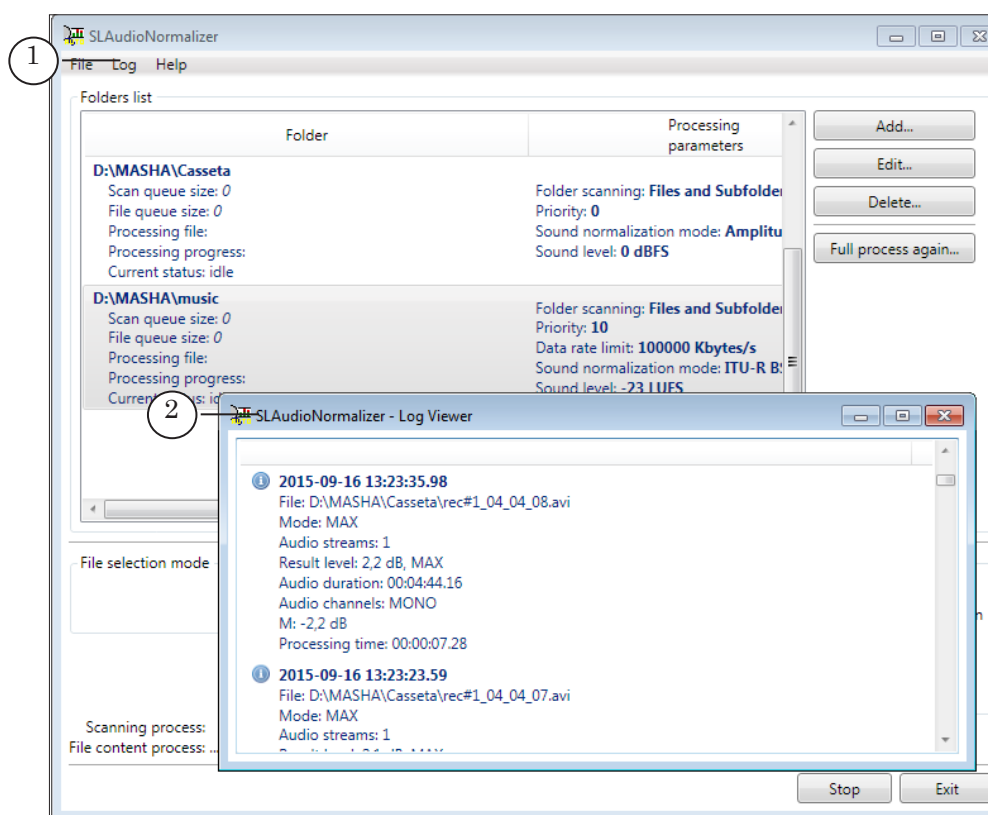
- Scanning process is name of folder scanned at the current moment;
- File content process is name of file scanned at the current moment.

If the Exit button is clicked in the Scanning folder mode then confirmation message on finishing monitoring and exiting the program appears.

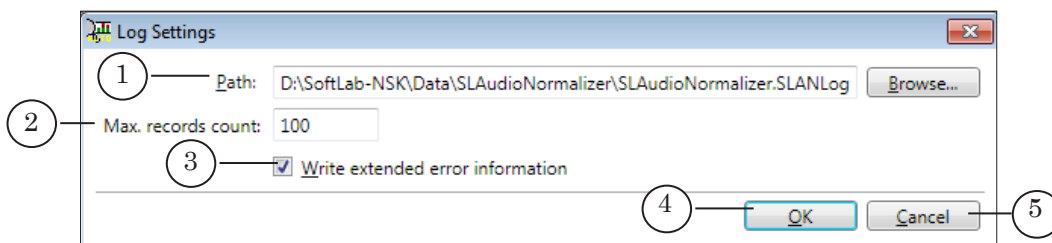
6. Customizing and Viewing Log

The Log menu (1) has commands for customizing and viewing working log.

Use the Log > Show Log View command to open log (2).



Use the Log > Settings... command from the same menu to customize log settings.



Log Settings Window. Control Elements:

1 is a field with location and name of log file, i.e. a full path to file and button for opening standard dialog to specify file; 2 is a field used to specify maximal available quantity of records in log (additional notice is given below); 3 is check box used to enable/disable logging extended information on errors appeared at processing; 4 is button used to close the window with applying the changes; 5 is button used to close the without applying any changes.

Note: A record in log is a block of information about one executed operation (launch/stop of monitoring, file processing). When quantity of records specified in settings is reached logging is not stopped: earlier made records are replaced by new ones.

7. Menu Commands

The main program window and context menu of program icon have almost the same set of commands. Table below describes these commands.

Right-click program icon to open program context menu. The icon is located in system tray.

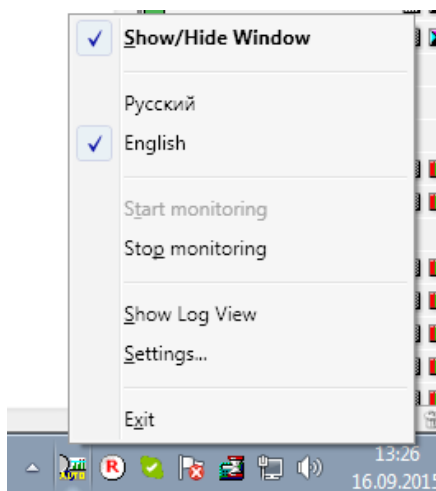




Table 2. Commands of the main and context menus

Command	Purpose	Command in the main menu
Show/Hide window	The command is used to show/hide the main program window over other windows or minimize it to icon.	Absent
Russian	Commands for selecting user interface language.	Help>Language
English		
Start monitoring	The command is used to switch monitoring on: start scanning specified folders and automatic processing files in folders with a purpose of volume normalizing.	Absent
Stop monitoring	The command is used to switch monitoring mode off.	Absent
Show Log View	The command is used to open additional window with information on work procedure.	Log
Settings...	The command is used to customize parameters of writing log.	
Exit	The command is used to finish work with the program: switch monitoring off if it is being implemented and close program window.	File
About program...	The command is used to show reference information on the program.	Help

Work Order

1. General Order

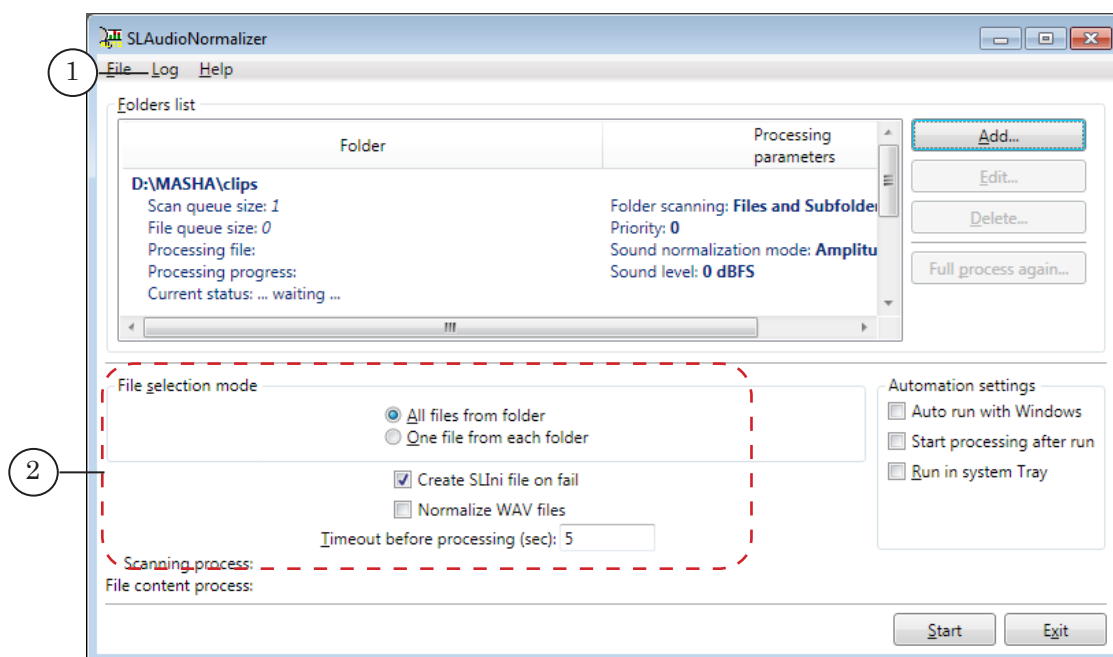
Usually the SLAudioNormalizer program is used when playlist in the FDOOnAir program includes clips with different sound levels and there is a necessity to normalize volume during playback.

It is recommended to customize and monitor in advance, before start broadcasting in FDOOnAir.

Work order is the following:

1. Specify folders with stored audio and video data for which it is needed to normalize volume on disk automatically.
2. Launch the SLAudioNormalizer program. You may use the Start menu: All programs > ForwardT Software > Tools > AudioNormalizer.
3. Adjust log settings if necessary.

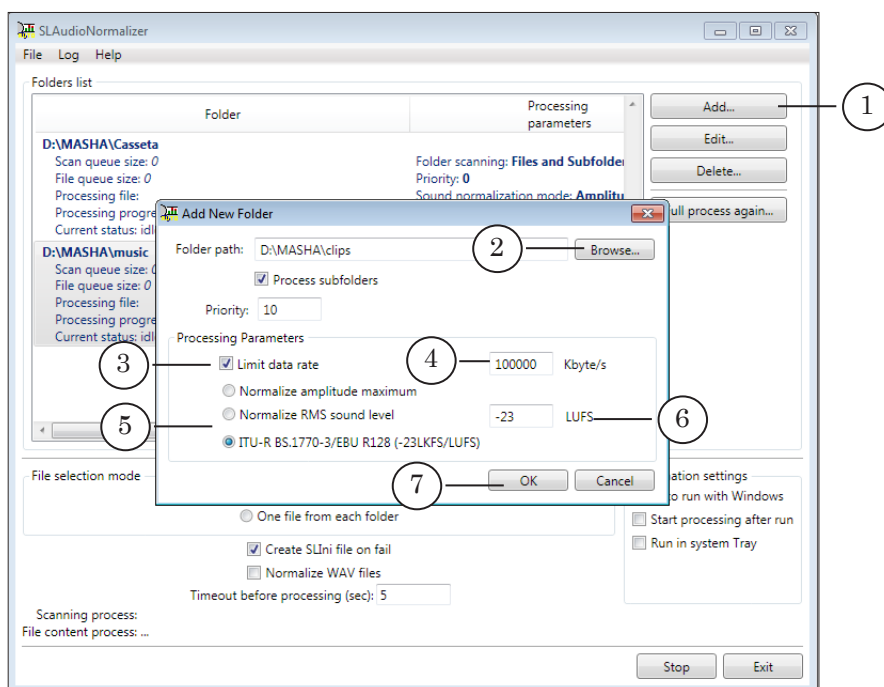
Use the Log (1) > Settings... menu command to open the window with log settings.



4. Customize general parameters of files processing using elements of the main program window (2). Detailed information on elements purpose you may find in the "Interface" section, the "4. Processing Mode" subsection.
5. Customize list with folders to be monitored. Click the Add button (1) in the main program window to add folder to list. Then click Browse... (2) and select the folder.

Specify limit of reading data rate for selected folder: put the (3) mark and specify maximal value in the (4) opposite area.

Note: If reading data limit is not specified then the program reads data from file with a maximal rate. It results to a high loading of disk from which the FDO nAir program outputs data on air. In this case disruption of playback on air may happen.

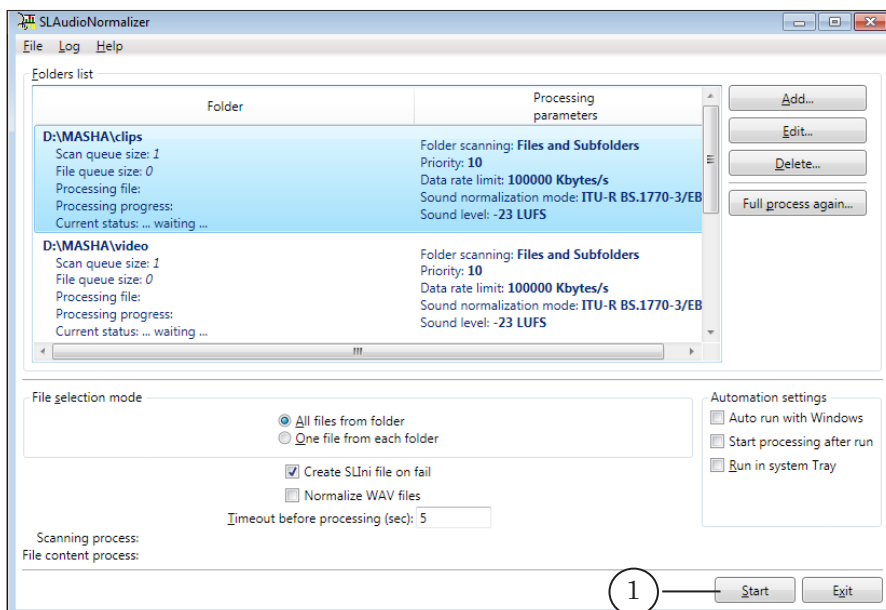


Select method of normalization by putting corresponding mark (5). Specify value (6) to which corresponding characteristic is fit: normalize amplitude maximum (dBFS), normalize root mean square sound level or normalize integral sound level (LUFS).

✓ **Important:** Specify target value taking into account specificities of selected method of normalization. Each method has its own algorithm of limit use. At the same values work of methods will be different. Recommendations on customizing normalization by root mean square level you may find in the subsequent section.

Click OK (7) to apply settings and close program window.

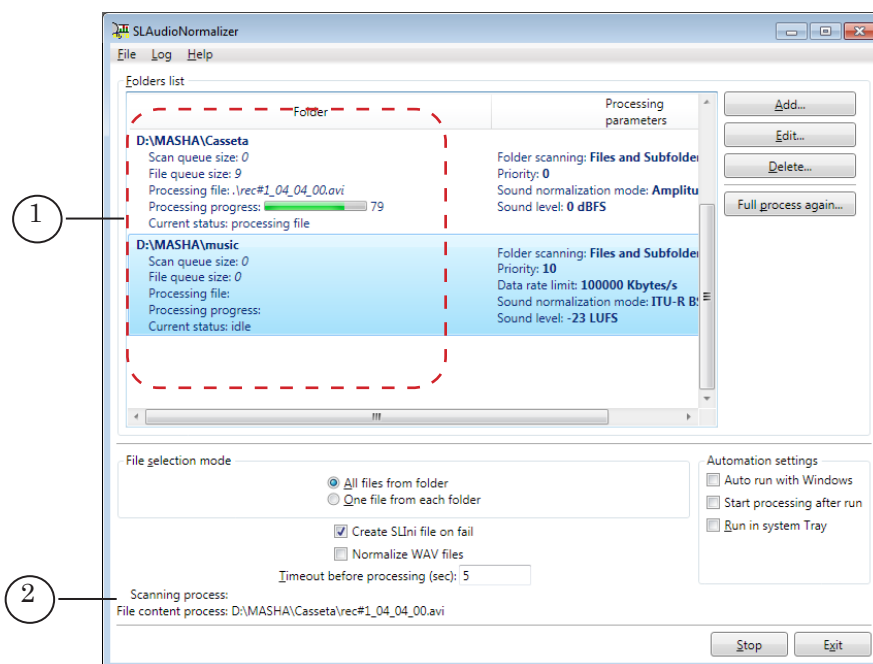
6. Click Start (1) to switch monitoring on.



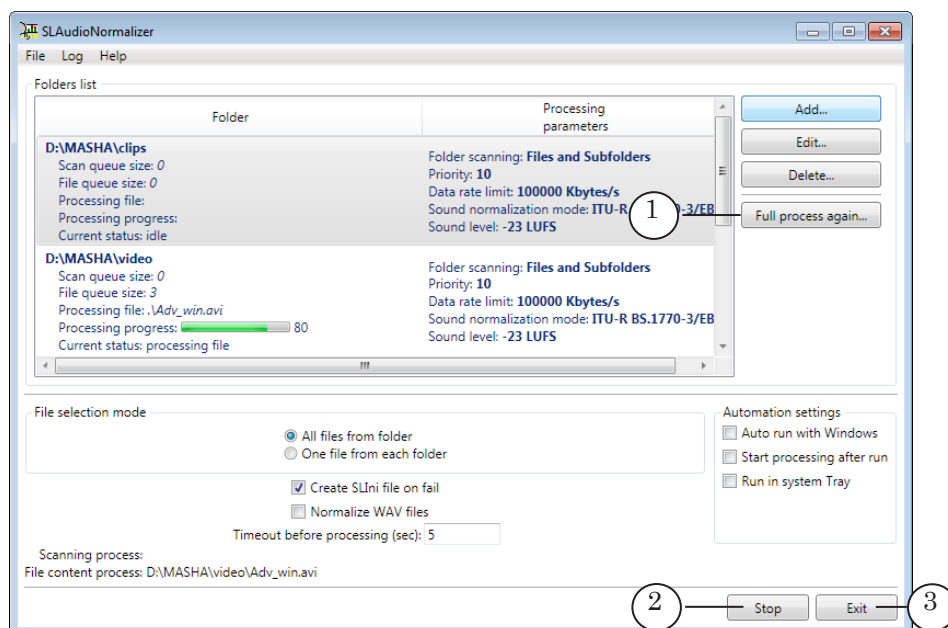
The program always scans specified folders when monitoring mode is on. The program detects new audio and video files for which the VolumeDB parameter value in SLIni-file is absent. After detecting such files the program starts automatic files processing calculating parameter value.

Created/changed SLIni files are recorded to the same folders where corresponding audio and video files are located.

- Information on working procedure is displayed in the main program window in the (1) table and in task tray area (2).



8. If necessary to force start processing files in any folder select the folder in the table and click the Full process again... button (1).



✓ **Important:** Forced files processing is implemented only when monitoring mode is on.

9. To switch monitoring off click Stop (2) or select the Stop command in context menu of program icon.
10. Click Exit (3) in the main program window to finish working with the program. Also you may select the Exit command in the context menu of program icon.

2. Normalization by Root Mean Square Sound Level (RMS). Recommendations For Configuration

If you select the Root mean square method of normalization take into account that root mean square value depends not only on sound amplitude but also on its content: on saturation of low, medium and high frequencies; subjective volume, etc.

Follow the given below recommendations to fit needed level of normalization by RMS correctly:

1. Customize level of passthrough sound so that volume on output corresponds all applicable requirements and norms.
2. Record a quite long fragment of a passthrough sound. Look for such fragment that it has as little silence and as much typical noise as it is possible.
3. Analyze RMS for this fragment.



Tip: We recommend using additional necessary programs included to the ForwardT Software products set: for recording fragment – the FDCapture program; to get report – the Forward AV Studio program (information on characteristics of sound is displayed in the Sound Statistics window opened via the Command > Statistics... menu command).

4. Then adjust RMS level of all media files to the same level. If the SLAudioNormalizer program is used then specify received value as the needed one (in condition if the RMS method is selected).



Useful Links

ForwardT Software set: description, download, documentation, solutions

<http://www.softlab-nsk.com/forward/index.html>

Support

E-mail: forward@softlab.tv

forward@sl.iae.nsk.su

forward@softlab-nsk.com

Forum

<http://www.softlab-nsk.com/forum> (currently available in Russian only)

Documentation for more information

1. [FDOnAir. Broadcast Automation. User's Guide](#)
2. [FDOnAir. Additional Sections. User's Guide](#)
3. [Forward AV Studio. Multitrack Audio and Video Editor. User's Guide](#)
4. [FDCapture. Capturing Video and Audio Data. User's Guide](#)

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